



## 10/100/1000BASE-T CONTROLLER WITH INTEGRATED TRANSCEIVER

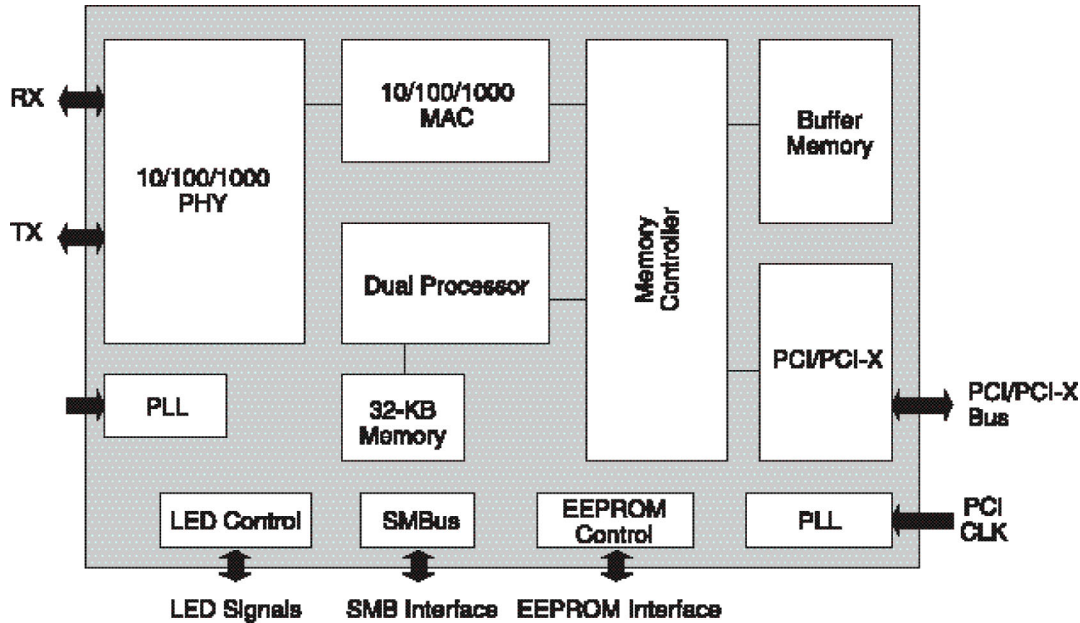
### FEATURES

- **Single-chip solution for LAN on Motherboard (LOM) and network interface card (NIC) applications**
  - Integrated 10BASE-T/100BASE-TX/1000BASE-T transceivers
  - 10/100/1000-Mbps triple-speed media access controller (MAC)
  - Host interfaces
    - PCI v2.2, 32/64-bit, 33/66 MHz
    - PCI-X v1.0 64-bit, 133 MHz
  - Ultra-deep, 96-KB, on-chip packet buffer
  - Dual, high-speed RISC cores with 16-KB caches
    - Programmable inline packet classification
  - SMBus controller
  - On-chip power circuit controller and Wake on LAN power switching circuit
- **Performance features**
  - TCP, IP, UDP checksum
  - TCP segmentation
  - CPU task offload
  - Adaptive interrupts
  - Ultra-deep, 96-KB packet buffer
- **Robust manageability**
  - PXE 2.0 remote boot
  - Alert Standard Format (ASF 1.0 support)
  - Statistics gathering (SNMP MIB II, Ethernet-like MIB, Ethernet MIB [802.3x, clause 30])
  - Comprehensive diagnostic and configuration software suite
  - ACPI 1.1a compliant (multiple power modes)
  - Wake on LAN
- **Advanced network features**
  - Priority queuing (802.1p layer 2 priority encoding; support for four priority queues)
  - Virtual LANs (802.1q VLAN tagging; support for up to 64 VLANs)
  - Jumbo frames (9 KB)
  - 802.3x flow control
- **Advanced server features**
  - Link aggregation (802.3ad, GEC/FEC, Smart Load Balancing™ [supports heterogeneous teams])
  - Heterogeneous, mixed-speed failover
  - Hot-Plug PCI support
- **Low power design—3.3 V/1.8 V, 0.18-µm CMOS**
- **388-pin PBGA package**
- **3.3V I/Os (5V tolerant)**
- **JTAG**

### SUMMARY OF BENEFITS

- **Industry's first 10/100/1000 MAC/PHY solution (power and space optimized for LOM and low-profile NIC applications)**
- **Completely backward compatible:**
  - To existing 10/100 network infrastructure
  - To existing PCI-based desktop and server platforms
- **Futureproof**
  - PCI-X interface, on-chip programmable CPUs, ASF support
- **Performance focused (optimized for throughput and CPU utilization)**
  - Adaptive interrupts
  - PCI-X eliminates PCI bottlenecks
  - Ultra-deep, 96-KB packet buffer lowers CPU utilization and averts PCI congestion
  - CPU task offloads
- **Robust and highly manageable**
  - PXE 2.0, ACPI 1.1, Wake on LAN, ASF 1.0
  - Integrated cable testing (link quality, length, pair skew, pair polarity, pair swap)
- **Advanced features**
  - VLAN, priority queuing, jumbo frames
  - RISC processors for advanced packet classification
- **Server-class reliability, availability, and performance features**
  - Link aggregation and load balancing
    - Switch-dependent
  - 802.3ad (LACP), generic trunking (GEC/FEC)
    - Switch and NIC independent
  - Smart Load Balancing™ (unique technology that supports heterogeneous teams, and can operate with any switch)
  - Failover
    - Smart Load Balancing allows heterogeneous failover
  - Hot-Plug PCI support
- **Low power for zero airflow implementations**
  - 0.18-µm CMOS design
  - Advanced power management
- **Space savings for LOM**
  - 300-pin HBGA package
  - No external memory
  - Integrated power circuitry

# BCM5701 OVERVIEW



The BCM5701 is a fully integrated 10/100/1000BASE-T Gigabit Ethernet media access control and physical layer transceiver solution for high-performance network applications. The BCM5701 is a highly integrated solution combining triple-speed, IEEE 802.3 compliant media access controller (MAC), PCI and PCI-X bus interfaces, on-chip buffer memory, and integrated physical layer transceiver in a single device. The BCM5701 is fabricated in a low-voltage, 0.18- $\mu$ m CMOS process, providing a low-power system solution. By itself the BCM5701 provides a complete, single-chip Gigabit Ethernet NIC or LOM solution.

The BCM5701 includes a 10/100/1000 Mbps Ethernet MAC with full-half-duplex capability at all speeds, and a 10/100/1000 copper PHY. Support for the following 802.3 functions is featured in the MAC: VLAN tagging, layer 2 priority encoding, link aggregation, and full-duplex flow control.

The device provides both PCI v2.2 and PCI-X v1.0 bus interfaces. The BCM5701 provides a large on-chip buffer memory for stand-alone operation. Dual on-chip, high-performance processors enable custom frame processing features, including TCP segmentation.

The transceiver is fully compatible with the IEEE 802.3 standard for auto-negotiation of speed. Additionally, several Plug and Play enhancements have been added to make the device even more user friendly. A link quality indicator LED gives installers an instant visual indication if there are any issues with the wiring plant supporting operation at the desired speed, which include physical wiring defects or channel conditions, such as excessive cable length, return loss, crosstalk, echo, and noise. Broadcom's remote cable management and diagnostics software can be used with the device to provide remote management of

the cable and a first level of diagnostics and fault isolation. The BCM5701 continually monitors various channel conditions. The optional wire speed capability allows the BCM5701 to force auto-negotiation to be automatically limited by the speed that the channel can reliably support, rather than the performance of the end equipment.

## Target Applications of the BCM5701

Network Interface Card (NIC) designs		LAN on Motherboard (LOM) designs	
Single Port		Single Port	
10/100/1000 BASE-T	PCI 2.2 Adapters PCI-X v1.0 Adapters	10/100/1000 BASE-T	PCI 2.2 LOM PCI-X v1.0 LOM
1000 BASE-SX	PCI 2.2 Adapters PCI-X v1.0 Adapters	Dual Port	
1000 BASE-LX	PCI 2.2 Adapters PCI-X v1.0 Adapters	10/100/1000 BASE-T	PCI 2.2 LOM PCI-X v1.0 LOM
Dual Port			
10/100/1000 BASE-T	PCI 2.2 Adapters		

## BCM5701 Operating Systems:

- Microsoft® Windows® NT 4.0
- Microsoft Windows 2000
- Linux® 2.2
- NetWare® 4.11, 4.2 and 5.x
- Novell®

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